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NOTICE OF ALLOWANCE AND FEE(S) DUE

24498 7590 12/14/2009

Robert D. Shedd, Patent Operations
THOMSON Licensing LLC
P.O. Box 5312
Princeton, NJ 08543-5312

EXAMINER

ELPENORD, CANDAL

ART UNIT

PAPER NUMBER

2473

DATE MAILED: 12/14/2009

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/523,442

01/31/2005

Maxim Borisovich Belotserkovsky

PU020354

3857

TITLE OF INVENTION: CENTRALIZED BUFFER ARCHITECTURE FOR AN ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING (OFDM) RECEIVER

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1510 | \$300 | \$0 | \$1810 | 03/15/2010 |

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24498 7590 12/14/2009

Robert D. Shedd, Patent Operations
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P.O. Box 5312
Princeton, NJ 08543-5312

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| |
|--------------------|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/523,442 01/31/2005 Maxim Borisovich Belotserkovsky PU020354 3857

TITLE OF INVENTION: CENTRALIZED BUFFER ARCHITECTURE FOR AN ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING (OFDM) RECEIVER

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO | \$1510 | \$300 | \$0 | \$1810 | 03/15/2010 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|------------------|----------|----------------|
| ELPENORD, CANDAL | 2473 | 370-206000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER

ELPENORD, CANDAL

ART UNIT

PAPER NUMBER

2473

DATE MAILED: 12/14/2009

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 397 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 397 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

| | | | |
|-------------------------------|------------------------|-----------------------|--|
| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/523,442 | BELOTSERKOVSKY ET AL. | |
| | Examiner | Art Unit | |
| | CANDAL ELPENORD | 2473 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to October 20, 2009.
2. ☒ The allowed claim(s) is/are 1-9, 11-18, 20, renumbering as 1-18 respectively.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>July 31, 2009</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____. 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
|--|--|

DETAILED ACTION

Reasons For Allowance

1. The following is an examiner's statement of reasons for allowance:
2. Claims 1-9, 11-12, 13-18, 20, renumbering as 1-18 respectively.
3. The present invention is directed to an Orthogonal Frequency Division Multiplexing (OFDM) receiver where access to a centralized buffer is controlled by a receiver controller. The centralized buffer is shared by all the functional blocks or modules of the receiver. Each independent claim uniquely identifies the distinct claimed features.

Regarding independent claim 1 (currently amended) An Orthogonal Frequency Division Multiplexing (OFDM) receiver that is adapted to receive OFDM signals, the OFDM receiver comprising: a shared buffer that stores data corresponding to the OFDM signals; an equalizer tap initialization module that is adapted to exchange data with the shared buffer; a fine carrier estimation module that is adapted to exchange data with the shared buffer; a fine frame synchronization module that is adapted to exchange data with the shared buffer an equalizer module adapted to receive data from the shared buffer and equalize the data; and a receiver controller that controls the transfer of data from the shared buffer to the equalizer module and allows the equalizer tap initialization module, the fine carrier estimation module and the fine frame synchronization module to access the shared buffer responsive to receipt of at least a portion of a preamble by the OFDM receiver.

Regarding independent claim 13 (currently amended) A device, comprising: a shared buffer that stores data corresponding to signals; an equalizer tap initialization module that is adapted to exchange data with the shared buffer a fine carrier estimation module that is adapted to exchange data with the shared buffer; a fine frame synchronization module that is adapted to exchange data with the shared buffer an equalizer module adapted to receive data from the shared buffer and equalize the data; and a device controller that controls the transfer of data from the shared buffer to the equalizer module and allows the equalizer tap initialization module, the fine carrier estimation module and the fine frame synchronization module to access the shared buffer responsive to receipt of at least a portion of a preamble signal.

The prior arts of record, Nakai '034 discloses an Orthogonal Frequency Division Multiplexing (OFDM) receiver that is adapted to receive OFDM signals (see, "OFDM receiver for demodulating signals", col. 5, lines 48-57, fig. 1, OFDM Receiver), the OFDM receiver (see, "OFDM receiver for demodulating signals", col. 5, lines 48-57, fig. 1, OFDM Receiver) comprising: a shared buffer that stores data corresponding to the OFDM signals (see, "RAM for storing OFDM symbols wherein the symbols corresponds to unit of data", 44-51); a processor (see, FFT processor for performing Fast Fourier transform on the stored data in the RAM ", col. 4, lines 44-60) that is adapted to receive data from the shared buffer (see, FFT processor for performing Fast Fourier transform on the stored data in the

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RAM ", col. 4, lines 44-60), perform computations on the data (see, FFT processor for performing Fast Fourier transform on the stored data in the RAM ", col. 4, lines 44-60) and return data to the shared buffer (see, storing the processed data (i.e. resultant data) from the FFT processor in the RAM, col. 4, lines 8-27, col. 5, lines 6-25).

Park '030 from the same field of endeavor discloses an equalizer module (fig. 1, Equalizing Section 600), an equalize module that is adapted to receive the data from the shared buffer and equalize the data (fig. 1, see Equalizing Section 600 for equalizing data (i.e. pilot signals) received from the memory unit 720, col. 3, lines 57 to col. 4, lines 20, see "performs equalization for compensated channel distortion", recited in col. 4, lines 9-21); and a receiver (fig. 1, see Equalizing Section 600 for equalizing data (i.e. pilot signals) received from the memory unit 720, col. 3, lines 57 to col. 4, lines 20, see "performs equalization for compensated channel distortion", recited in col. 4, lines 9-21) controller that controls access to the shared buffer by the processor and controls the transfer of data from the shared buffer to the equalizer module (fig. 1, Controller 570 for the controlling access to the memory unit, the FFT processor 710 and the Equalizer element 600, col. 3, lines 64 to col. 4, lines 8).

The prior arts cited above are silent with respect to the uniquely distinct claimed features: "an equalizer tap initialization module that is adapted to exchange data with the shared buffer; a fine carrier estimation module that is adapted to exchange data with the shared buffer; a fine frame synchronization module that is adapted to exchange data with the shared buffer an equalizer

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module adapted to receive data from the shared buffer and equalize the data; and a receiver controller that controls the transfer of data from the shared buffer to the equalizer module and allows the equalizer tap initialization module, the fine carrier estimation module and the fine frame synchronization module to access the shared buffer responsive to receipt of at least a portion of a preamble by the OFDM receiver".

The prior arts either singularly or in combination fail to anticipate or render the uniquely distinct claimed features obvious.

Dependent claims 2-9, 11-12, 14-18 and 20 are allowed by virtue of their dependency on claims 1, 13 respectively.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Belotserkovsky et al (US 6,650,617 B1), Kobayashi et al (US 6,430,149 B1), Wilson et al (US 7,027,540 B2), Crawford et al (US 6,549,561 B2), Rafie et al (US 6,628,707 B2), Scarpa et al (US 2004/0001563 A1), Belotserkovsky et al (US 6,944,244 B2), Korobkov et al (US 2007/0183308 A1) and Kumagai et al (US 7,058,002 B1).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to CANDAL ELPENORD whose telephone number is (571) 270-3123. The examiner can normally be reached on Monday through Friday 8:00AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Bin Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Candal Elpenord/
Examiner, Art Unit 2473

/KWANG B. YAO/
Supervisory Patent Examiner, Art Unit 2473